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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/051,970	01/18/2002	Bruce A. Gnade	4380.000300/KDG	1567
23720	7590	07/18/2006	EXAMINER	
WILLIAMS, MORGAN & AMERSON			MAYEKAR, KISHOR	
10333 RICHMOND, SUITE 1100			ART UNIT	
HOUSTON, TX 77042			PAPER NUMBER	

1753

DATE MAILED: 07/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/051,970	GNADE ET AL.	
	Examiner	Art Unit	
	Kishor Mayekar	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-60 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-60 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This is in response to the remand by the Board of Appeals and Interferences on March 30, 2006.

Claim Rejections - 35 USC § 102 and § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 11, 14, 16, 19, 21, 24, 26, 29, 41, 44, 46 and 49 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Chalamala et al. ("Effect of CH₄ on the electron emission characteristics of active molybdenum field emitter arrays", J. Vac. Sci. Technol. B 16(6), 1998, pp. 307-376), hereinafter referred as the first Chamala publication, in light of Chalamala et al. ("Interaction of H₂O with active Spindt-Type molybdenum field emitter arrays", J. Vac. Sci. Technol. B, 17(2), pp. 303-305, 1999), hereinafter referred as the second Chalamala publication, MSDS of Molybdenum (obtained from Alfa Aesar Co., May 30, 2000) and MSDS of Methane (obtained

from Airgas Inc, January 3, 2001). The first Chalamala publication, a reference cited by Applicant, discloses a study on the effects of CH_4 on the electron emission characteristics of active field emitter arrays, the study comprises the steps of operating the field emitter array at a low power of 60 V; exposing the field emitter array to at least one gas (CH_4); and forming molybdenum carbides from carbide ions with molybdenum on the field emitter tip (see section Results and Discussion in pages 3074-3075). The first Chalamala publication does not detail the generation of at least one of a high electric field and a high electron flux during the operating step, and the generating at least one radical species as claimed. The second Chalamala publication, a reference cited in previous Office action, shows in another study with H_2O that electron emission from molybdenum field emission arrays is sensitive to the contamination of emission surfaces by residual gases present in a vacuum envelope (abstract and second full paragraph of the left column in page 303), wherein the residual gases in the field emitter arrays include O_2 , H_2O , CO_2 , N_2 , H_2 and hydrocarbons like CH_4 (paragraph crossing left and right columns in page 303), and the dissociation and ionization of the residual gases by their interaction with a high electric field and electron flux (the following paragraph in page 303). The second Chalamala publication also discloses, in

paragraph crossing left and right columns in page 304 and the following paragraph, an experiment comprising the steps of operating a field emitter array with voltage of 60 V to generate a high electric field and electron flux, exposing the field emitter array to only H₂O residual gas, generating at least one radical species (dissociating or ionizing) from the exposed residual gas to the high electric field and electron flux, and reacting the at least one radical species with the field emitter molybdenum tip (where the molybdenum is considered as a chemical toxin according to its MSDS in section 11 of page 4 obtained from Alfa Aesar Co.). A similarly exists when exposing the field emitter to CH₄ as that to H₂O. As such the first Chalamala publication inherently has the detailed steps. Also CH₄ is the exposed gas and considered as a chemical toxin (according to its MSDS in section 3 of page 8 and by various states in section 15 of page 7 obtained from Airgas Inc.).

The disclosure in the prior art of any value within the claimed range is an anticipation of that range. And where the range overlaps or lies inside the range disclosed by the prior (60 V in operating power), the subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the first Chalamala publication's teachings

because overlapping ranges have been held to be obvious, *In re Wertheim* 191 USPQ 90.

4. Claims 11, 14-16, 19 and 20 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Chalamala et al. ("Effect of O₂ on the electron emission characteristics of active molybdenum field emission cathode arrays", J. Vac. Sci. Technol. B, 16(5), pp. 2859-2865, 1998), hereinafter referred as the third Chalamala publication. The third Chalamala publication, another reference cited in previous Office action, discloses an experiment comprising the recited steps of operating, exposing and generating (full paragraph in right column of page 2859). The third Chalamala publication also discloses there the step of reacting the at least one radical species with molybdenum tip surfaces of the field emitter array, wherein the metal molybdenum is a chemical toxin.

5. Claims 12, 13, 17, 18, 22, 23, 25, 27, 28, 30-40, 42, 43, 45, 47, 48 and 51-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over either the first Chalamala publication in light of the second Chalamala publication or third Chalamala publication in view of Applicant's admission. The difference between

each of the Chalamala publications is the limitation of the recited process parameter and cathode-to-gate distance. However, Applicant admits in page 7 of the specification that recent advances in field emission arrays to utilize the above limitation. The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified each of the above applied reference's teachings as admitted by Applicant because the selection of any of known equivalent field emitter arrays with the recited limitation would have been within the level of ordinary skill in the art.

Response to Arguments

6. Applicant's arguments filed in the appeal brief of May 11, 2005 have been fully considered but they are not persuasive.

In response to the Appellant's argument that each of the Chalamala publications "is completely silent with regard to chemical toxins and/or biological toxins" and "that neither molybdenum nor the hydrocarbons described in the Chalamala publication are toxins as defined by the specification in accordance with common usage in the art", the examiner finds this is to be unpersuasive. As chemical toxins disclosed in lines 15-20 of page 2 of the specification are from

chemical plants that produce ammonia, chlorine, insecticides, and the like, where there are large volume of highly toxic materials, and from manufacturing facilities that typically use arsine, germane, diborane, and the like, where there are large volumes of highly toxic materials in place. As hydrocarbons like CH_4 and metal molybdenum are used or produced in chemical plants and/or manufacturing facilities, the hydrocarbons and molybdenum are fit to the Appellant's above disclosure as chemical toxins according to their MSDS.

As to the argument that each of the Chalamala publications is completely silent with regard to any application of field emitter arrays to the detection, mitigation, and/or remediation of chemical toxins and/or biological toxins, the limitation on which the Appellant relies is not stated in the claims. Therefore, it is irrelevant whether each of the Chalamala publications includes the limitation or not.

As to the argument that each of the Chalamala publications "fails to describe or suggest reacting at least one radical species with at least one of a chemical toxin and a biological toxin, as set forth in independent claims 11 and 16", since in each of the Chalamala publications the ionizing residual gas as the radical species is being generated and since the experiment discloses the interaction of

the radical species with molybdenum tip surfaces of the field emitter array to form molybdenum carbide wherein the molybdenum is considered as a chemical toxin, each of the Chalamala publications indeed describes the above step of reacting.

As to the argument that each of the Chalamala publications "fails to describe or suggest exposing a low-power field emitter array (FEA) to at least one of a chemical toxin and a biological toxin and dissociating the at least one of the chemical toxin and the biological toxin exposed to at least one of a high electric field and a high electron flux formed by the low-power field [emitter] array (FEA), as set forth in independent claims 21, 26, 31 and 36", each of the Chalamala publications describes the above recited steps of exposing and dissociating.

As to the argument that each of the Chalamala publication "fails to describe or suggest ionizing at least one of a chemical toxin and a biological toxin exposed to at least one of a high electric field and a high electron flux, as set forth in independent claims 41, 46, 51 and 56", each of the Chalamala publications discloses the above recited steps of exposing and ionizing.

As to the argument that the present invention is not obvious over each of the Chalamala publications in view of the admitted prior art, since the

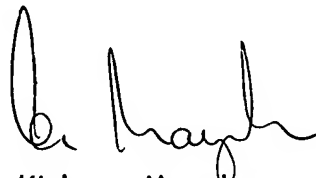
hydrocarbons and molybdenum are fit to the Appellant's disclosure in lines 15-20 of page 2 of the specification as chemical toxins, each of the Chalamala publications does disclose the limitations related to reacting, ionizing or dissociating a chemical toxin, and since the limitation on which the Appellant relies is not stated in the claim, the rejection stands.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kishor Mayekar whose telephone number is (571) 272-1339. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair->

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A handwritten signature in black ink, appearing to read 'Kishor Mayekar', is positioned above the printed name.

Kishor Mayekar
Primary Examiner
Art Unit 1753